

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVE 1 – PROPOSED ACTION

This proposed exploratory project (Alternative 1 – Proposed Action) submitted jointly by Warren E & P, Inc. and APC, consists of exploration and interim development of natural gas resources on Federal and fee leases in the BCII PA. The proposed location of wells and associated facilities is shown in **Figure 2-1**, and in **Exhibit 1** of the Master Surface Use Plan (MSUP), Appendix A.

The Proposed Action consists of constructing, drilling, completing, testing, operating, and reclaiming 12 new exploratory wells, the conversion of four existing wellbores to deep injection wells, and the drilling of one deep injection well at an existing well location to dispose of produced water. Related access roads, utilities, flowlines, pipelines, and production facilities are also planned for the Proposed Action. The location, lease number, well name, and well number of each well planned for the BCII PA are shown in **Table 2-1**.

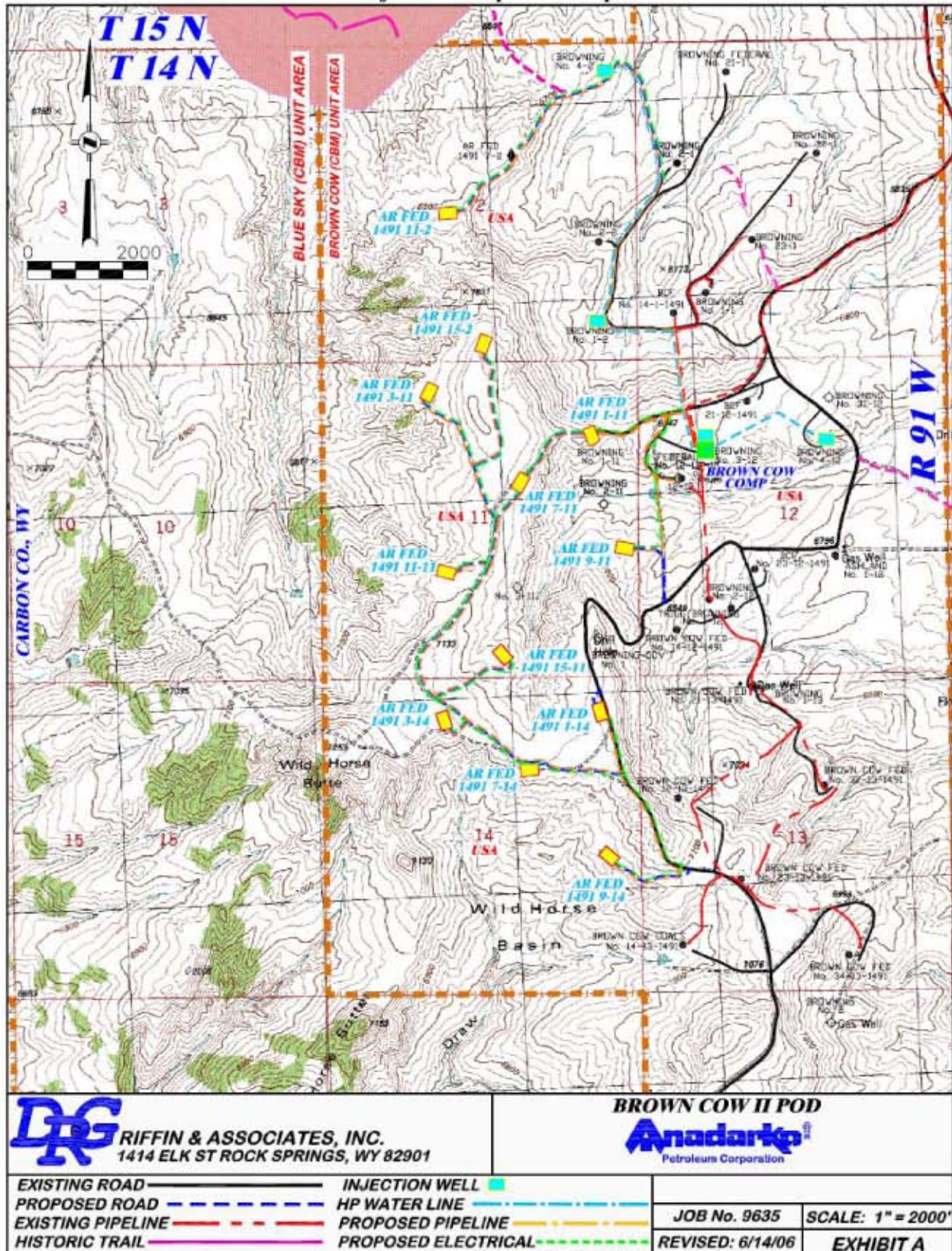
The proposed project is accessible from the Town of Baggs, Wyoming by traveling approximately 7.5 miles north on SH 789. The project is one of nine specified exploration areas subject to interim exploratory drilling within the Atlantic Rim Natural Gas Development Project area. All 12 proposed CBNG wells and four of five injection well locations are located on BLM RFO-administered Federal surface and mineral estate. The remaining injection well (15-36-91) is located on State of Wyoming surface and mineral estate.

The Proposed Action falls within guidance prepared as part of interim drilling activities associated with the Atlantic Rim EIS in Carbon County, Wyoming. The primary objective of interim drilling is to evaluate the following aspects of gas development in the ARPA:

- Productivity of the coals,
- Economics of drilling and completion techniques,
- Feasibility of dewatering the coals,
- Depths or pressure windows that may be preferred as the target for economic gas production, and
- Reduce leaseholder hardship during preparation of the Atlantic Rim EIS.

In addition, the RFO must determine through a NEPA analysis that no significant or adverse impacts would occur with the proposed development. With a Finding of No Significant Impact, this project will comply with Council on Environmental Quality (CEQ) regulations regarding activities allowable during concurrent EIS preparation (40 CFR 1506.1).

Figure 2-1
Project Development Map



**Table 2-1
Brown Cow II Project**

Lease Number	Well Name	Location
WYW-029262	AR Federal 1491 11-2	NE SW 2-T14N-R91W
	AR Federal 1491 1-11	NE NE 11-T14N-R91W
	AR Federal 1491 7-11	SW NE 11-T14N-R91W
	AR Federal 1491 9-11	NE SE 11-T14N-R91W
WYW-0208269	AR Federal 1491 15-2	SW SE 11-T14N-R91W
WYW-131274	AR Federal 1491 3-11	NE NW 11-T14N-R91W
	AR Federal 1491 11-11	NE SW 11-T14N-R91W
	AR Federal 1491 15-11	SW SE 11-T14N-R91W
WYW-136207	AR Federal 1491 1-14	NE NE 14-T14N-R91W
	AR Federal 1491 3-14	NE NW 14-T14N-R91W
	AR Federal 1491 7-14	SW NE 14-T14N-R91W
	AR Federal 1491 9-14	NE SE 14-T14N-R91W
Deep Injection Wells		
WYW-0208269	API 49-007-20978	SE SE 2-T14N-R91W
WYW-0208269	API 49-007-20750	SW NW 12-T14N-R91W
WYW-0208269	API 49-007-20980	W NE 12-T14N-R91W
WYW-0208269	API 49-007-21052	NE NE 2-T14N-R91W
ST 93-00078	API 49-007-21513	SW SE 36-T15N-R91W

The Wyoming Oil and Gas Conservation Commission (WOGCC) established an 80-acre well spacing pattern for wells completed in the Mesaverde Group in the BCII PA. Spacing for this area was established under Cause No.1, Order No. 1, Docket Nos. 157-2001 and 113-2002.

Interim drilling within the BCII PA would occur over a six to 12-month period. Wells would be tested for six to 12 months to fully evaluate the economics of any additional development. The life of the project is estimated to be between 10 and 20 years. The productive life of a gas well completed in Mesaverde Group coals is estimated to be 15 years.

Specific components of the proposed project are shown in the MSUP (Appendix A), Master Drilling Plan (MDP) (Appendix B), and the project development map (**Figure 2-1**). Project plans are summarized below in the section titled “Plan of Development.” Where feasible, existing infrastructure will be used or upgraded.

Refer also to Section 2.1.10.1 of this Chapter for Applicant-Committed Mitigation Measures.

2.1.1 Plan of Development

The Proponents will follow the procedures outlined below to gain approval for the activities proposed for the BCII PA. Development also will be approved, as required, by other agencies.

2.1.2 Preconstruction Planning and Site Layout

The Proponents have submitted Federal APDs and Right-of-Way (ROW) applications, along with a MSUP, MDP, and a project map to the RFO that shows the specific location of the proposed activities (such as individual drill sites, pipeline corridors, access roads, and other facilities). The applications include site-specific plans and mitigation measures that describe the proposed development (drilling plans with casing/cementing program, surface use programs with construction details for roads and drill pads, and site-specific reclamation plans). Approval of all planned operations will be obtained in accordance with the applicable regulations and Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases). Stormwater discharges during construction would be managed in accordance with a stormwater permit issued by the Wyoming Department of Environmental Quality (WDEQ). Water disposal is authorized through the WOGCC.

The proposed facilities have been staked by the Proponents and inspected by an interdisciplinary team (IDT) from the BLM to verify consistency with the approved RMP, applicable rules and regulations, appropriate BMPs, and stipulations contained in the oil and gas leases. As appropriate, the BLM will add COAs to mitigate environmental consequences of the Proposed Action or to ensure compliance with applicable rules, regulations, and BMPs.

A general discussion of proposed construction techniques to be used for the proposed project is described in the following sections. For a complete description of the Proposed Action, refer to Appendices A and B (MSUP and MDP, respectively). These construction techniques apply to drill sites, pipelines, and access roads within the BCII PA and may vary among well sites.

2.1.3 Construction Phase

2.1.3.1 Construction of Access Roads

The BCII PA is accessible from Baggs, Wyoming by traveling approximately 7.5 miles north on SH 789 then turning right onto BLM Road 3309 for approximately 5.5 miles until entering the Browning Field operated by Anadarko E & P Company LP.

All existing and proposed access roads would be constructed and maintained to minimum standards for a BLM Resource Road, as outlined in BLM Manual 9113. The Operator proposes to upgrade and construct approximately 25,902 feet of new road to access the proposed pad facilities. The travel-way would have a running surface approximately 14 feet wide, except for turnouts, and the disturbed roadway width would be 50 feet. Road construction would result in 29.7 acres of short-term surface disturbance. All roads would be surfaced with gravel for the duration of production operations. Upon reclamation of the road disturbance not necessary for road use/maintenance, it is expected that the long-term (life of project) disturbance width would equal 30 feet, yielding a long-term disturbance area of 17.8 acres.

Maintenance of the roads used to access well locations would continue until final abandonment and reclamation of the well locations. A regular maintenance program would include, but is not limited to, blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Existing roads would be maintained in a safe and usable condition.

Drainage crossings along access roads would be maintained with culverts (a minimum of 18 inches in diameter) Rip-rap would be added at the outlet of each culvert to minimize erosion. Additional culverts would be added as the need arises, or as directed by the BLM's Authorized Officer.

2.1.3.2 Well Pad Design and Construction

Information on each Federal well is contained in the BLM APD Form 3160-3, Well Survey Plat, and Well Pad Cross Section on file with the BLM. Surface disturbance would be kept to a minimum at each well location. Each well pad would be 300 feet by 200 feet, which includes the reserve pit but not the area for temporarily storing topsoil, spoil piles, and the cut and fill slopes. Each well pad would be leveled using cut and fill construction techniques, where needed. The top six to eight inches of soil (more if available) and associated vegetative material would be removed and stockpiled prior to constructing each well pad. Drainage ditches would be constructed as necessary to divert stormwater away from each well pad. It is estimated that each well pad would disturb approximately 2.0 acres in the short-term, or until interim reclamation is completed. After interim reclamation, each well location would result in a 0.25-acre long-term disturbance for the life of the project.

The Proponents plan to use one reserve pit at each drilling location (30 feet by 70 feet), which would be designed and constructed according to WOGCC and BLM requirements. The reserve pit would be open for an estimated two to eight weeks to allow for evaporation of pit fluids. During this time, the pit would be closed off from wildlife and livestock by two strands of barbed wire above a woven wire fence.

2.1.4 Drilling and Completion Operations

A conventional drilling rig would be used to drill the gas wells. Additional equipment and materials needed for drilling operations would be trucked to the drill location.

Water for use in drilling the wells would be obtained from existing wells completed in the coal seams of the Mesaverde Group. Approximately 700 barrels of water (almost 30,000 gallons) would be needed to drill each well. The actual volume of water used in drilling operations would depend on the depth of the well and any losses that might occur during drilling. Approximately 70,000 gallons of water per well would be needed for preparation of cement, approximately 14,000 gallons of water per well would be needed for stimulation of the well, and approximately 55,440 gallons of water per well would be needed to control dust. In all, nearly 170,000 gallons (approximately 0.5 acre-feet) of water per well would be used. Dust abatement using produced water will comply with all applicable WOGCC, WDEQ, and BLM requirements. Only water suitable for livestock use would be used for dust abatement and only disturbed areas would be sprayed.

No oil or other oil-based drilling additives, chromium/metals-based mud, or saline mud would be used during drilling of the proposed wells. Only fresh water, biodegradable polymer soap, bentonite clay, and non-toxic additives would be used in the mud system. Details regarding the mud program are incorporated within the MDP. The proposed wells would not produce oil or salt water typical of oil production. Furthermore, other liquid hydrocarbons are not anticipated. Should unexpected liquid petroleum hydrocarbons (e.g. crude oil or condensate) be encountered during drilling or well testing, it would be contained in on-site test tanks.

Depending on the location of the coal seam, each producing well would be drilled to an approximate depth of 2,025 feet to 3,325 feet. Natural gas in the coal seam would be produced through perforations in the casing. The well control system would be designed to meet the conditions likely to be encountered in the hole and would conform to BLM and State of Wyoming requirements.

A mobile completion rig similar to the drill rig may be transported to the well site and used to complete each well. Completion operations are expected to average two to five days per well. When the applicable permits are received, natural gas may be vented or flared, and water may be temporarily contained in the reserve pit (for up to 90 days) or trucked to an alternative disposal site during the testing period. Wells determined to be productive would be shut-in until pipelines and other production facilities are constructed, if necessary.

The injection wells would be drilled with the same equipment and personnel used for the gas wells. The depth of the injection wells, which would be completed for the Haystack Mountain Formation, is expected to be between 3,000 feet and 5,000 feet. Recompletion of the four existing wellbores and the drilling and completing of a single injection well would require approximately seven to 14 days at each location; installing surface equipment, holding tanks, and pumping equipment may require an additional 14 days. The single new injection well would be drilled on an existing location next to an existing wellbore. This would result in 0.25 acre of additional short-term disturbance. It is anticipated that no additional long-term disturbance (unreclaimed disturbance) would result from operations associated with the recompletion or drilling of injection wells.

2.1.5 Production Operations

Wells in the BCII PA are expected to produce 800,000 cubic feet of gas per day (CFD) and between 400 barrels to 3,000 barrels of water per well each day. The gas would be transported from the well by a pipeline to the proposed compressor station. The water would be stored on-site in a storage tank then disposed of via flowlines to the proposed injection well. All produced water would be managed per Onshore Order No. 7.

2.1.5.1 Well Production Facilities

Wellhead facilities would be installed if the wells are productive. Natural gas and produced water would be collected and transported from the wellhead via buried pipelines. Gas and water would be measured as specified in the MSUP. Additionally, a vertical separator at some well sites would separate gas from the water stream.

The long-term surface disturbance at the location of each productive well (after areas unnecessary for production operations are reclaimed) would encompass 0.25 acre, including cut and fill slopes. Typically, only the production facilities at the well site would be fenced or otherwise removed from existing uses. A loop road or a small gravel pad area would provide a safe turnaround area for vehicles. **Figure 2-2** shows a typical CBNG well and pad before reclamation is complete.

**Figure 2-2
CBNG Well and Pad**



2.1.5.2 Power Generation

Electricity would be used to power pumps during well development and to initiate and maintain production. An electrical generator located at the proposed compressor station would be utilized to provide electricity to the wells. The distribution system would consist of utility lines buried in the road ROW. These lines would be installed in trenches approximately three feet deep.

2.1.5.3 Summary of Pipelines and Related Facilities

Construction and installation of the gas delivery pipelines would occur before the productivity of the wells has been confirmed. Pipeline corridors would be reclaimed as soon as practical after construction of the pipeline is complete. Two types of pipelines would be constructed as part of the proposed project:

1. A gas-gathering pipeline system (low pressure) would be constructed from the wellheads to the compressor station. This system would use high-density polyethylene (HDPE) pipe, starting with a four-inch diameter pipe at the wellhead and graduating to a 20-inch diameter pipe at the inlet to the compressor.
2. A produced water-gathering pipeline system (low pressure) would be constructed from the wellheads to the centralized facilities for injection. This system would use HDPE pipe, starting with a four-inch diameter pipe at the wellhead and graduating to a 20-inch diameter pipe at the injection well.

Gathering Systems and Utilities

The proposed gathering systems and utility lines would be located parallel and adjacent to access roads in separate trenches along either side of the road ROW. A working space for installation of these facilities would also be designated within the road ROW.

Trenches would be excavated to install the pipelines and electrical lines. Trenching would occur as close to the road ROW as feasible. Trenches excavated for well gathering lines and electrical

lines (which would require a disturbed width of 20 feet for gas and water lines on one side of the road and a disturbed width of 10 feet for electrical lines on the other side of the road, yielding a total short-term disturbance width of 80 feet, when adjacent and parallel to proposed access roads) would be reclaimed as soon as practical after trenching and backfilling are complete. The new gathering lines and utilities would temporarily disturb 24.4 acres and these disturbances would be reclaimed to BLM specifications.

To minimize surface disturbance, the Operator would use wheel trenchers (ditchers) or ditch witches, where possible, to construct all pipeline trenches associated with this project. Track hoes or other equipment would be used where topographic or other factors require their use. Trenches greater than 0.25 mile in length that are open for the installation of pipelines would have plugs placed to allow livestock and wildlife to cross the trench. Placement of plugs would be determined in consultation with the BLM.

Excavated topsoil material would be stockpiled and segregated. Topsoil would not be mixed or covered with subsurface material. After construction, cut and fill slopes would be water-barred or regraded to conform to the surrounding topography and reclaimed to pre-disturbance appearance.

Facilities for Injection

Produced water from individual wells would be gathered and routed to central storage facilities located next to injection wells. Produced water-gathering pipelines would be constructed along well access roads from the wellhead to the injection facilities.

Five deep injection wells would be approved by the WOGCC (locations are shown on **Figure 2-1**). The approximate maximum injection capacity of the five injection wells would be 15,000 barrels per day (bbls/day) per well.

Compressor Station

An additional compressor station would be constructed next to the existing compressor station located in SW NW Sec. 12, T14N-R91W. This site is a highly disturbed location and the installation of the compressor would not result in new disturbance.

The compressor station would be sized to handle five million CFD from 15 pounds per square inch (psi) suction pressure to 1,200 psi discharge pressure. A natural gas power engine would power the facility and would be designed to meet all the specifications established by the applicable WDEQ – Air Quality Division (AQD) permit. Emissions resulting from the compressor station would be less than 1.5 grams of nitrogen oxide (NO_x) per brake horsepower per hour (g/bhp-hr), resulting in less than 16.7 tons per year of NO_x as well as less than 0.5 g/bhp-hr of carbon monoxide (CO), resulting in less than 5.6 tons per year of CO. **Figure 2-3** shows a typical CBNG compressor station.

Figure 2-3
CBNG Compressor Station



2.1.6 Maintenance

The Proponents would operate all wells, pipelines, and ancillary production facilities in a safe manner, as set forth by standard industry operating guidelines and procedures. Routine maintenance of producing wells would be necessary to maximize performance and to detect potential difficulties with gas production operations. Each well location would be visited several times per week to ensure that operations are proceeding in an efficient and safe manner. The visits would include checking separators, water meters, valves, fittings, and on-site storage of produced water and condensates. The on-site equipment also would be routinely maintained, as necessary. Additionally, all roads and well locations would be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

2.1.7 Estimates of Traffic and Work Force

Estimated traffic requirements for drilling, completion, and field development operations are shown on **Table 2-2**. The “Trip Type” column lists the various service and supply vehicles that would travel to and from the well sites and production facilities. The “Round-Trip Frequency” column lists the number of trips, both external (to and from the BCII PA) and internal (within the BCII PA). The figures provided on **Table 2-2** should be considered general estimates. The level of drilling and production activity may vary over time in response to weather and other factors.

**Table 2-2
Traffic Estimates**

Trip Type	Round-Trip Frequency	
	External (to/from BCII PA)	Internal (within BCII PA)
Rig crews	4/day	4/day
Engineers ^a	2/week	1/day/rig
Mechanics	4/week	4/week
Supply delivery ^b	1/week	2-4/day
Water truck ^c	1/month	2 round trips/day
Fuel trucks	2 round trips/well	2 round trips/well
Mud trucks ^d	1/week	2/day
Rig move ^e	8 trucks/well	8 trucks/well
Drill bit/tool delivery	1 every 2 weeks	1 every 2 weeks
Completion		
Small rig/crew	1/day	1/day
Cement crew	2 trips/well	2 trips/well
Consultant	1/day	1/day
Well loggers	3 trips/well	3 trips/well
Gathering systems	2/day	2/day
Power systems	2/day	2/day
Compressor stations	2/day	2/day
Other field development	2/day	2/day
Testing and operations	2/day	2/day

Notes:

^a Engineers travel to BCII PA weekly and stay in a mobile home at the BCII PA during the week.

^b Current plans are to establish a central supply area within the BCII PA and deliver supplies weekly.

^c Water trucks would deliver water to rigs from a location within the BCII PA.

^d Current plans are to establish a central mud location within the BCII PA and deliver mud weekly.

^e Four trucks would be required to move each rig to the BCII PA. When drilling is complete in a BCII PA, each rig would move to the next BCII PA.

2.1.8 Site Restoration and Abandonment

The Proponents would completely reclaim all disturbed areas that are not needed for production through the following procedures:

Short-Term (Interim) Reclamation

- Within one year of drilling, stabilize the disturbed area by recontouring areas unnecessary for production operations, mulching, providing run-off and erosion control, establishment of new vegetation, and weed control, as necessary.

- Reserve pit fluids would be evaporated, removed, or solidified within one year from the date drilling operations reached total depth (TD).

Long-Term (Final) Reclamation

- Recontour all disturbances to approximately the topography that existed prior to construction, and re-spread topsoil.
- Restore primary productivity of each site and establish vegetation that provides for natural plant and community succession.
- Establish a vigorous stand of desirable native plant species resistant to the invasion of noxious or undesirable species.

In the long-term, reclaimed landscapes should have characteristics that approximate the original visual qualities of the surrounding area.

Performance Standards

The following performance standards should be used to determine the attainment of successful revegetation and reclamation:

- All disturbed areas should have at least 50% of pre-disturbance vegetation cover of protective material within six months after reclamation.
- By the second year, at least 50% vegetative cover should have been established.
- By the fifth year, at least 80% of the site should be vegetated.
- The reclaimed area should be comprised of at least 20% of the species contained in the seed mix and/or present on the adjacent undisturbed areas. No single species should account for more than 50% of the total vegetative cover unless similar to the adjacent undisturbed areas. Noxious weeds will be controlled.
- Erosion condition of the reclaimed areas is equal to or in better condition than the adjacent undisturbed areas.

Visual resource management (VRM)-friendly snow fencing would be erected, where applicable, to capture snow drifting across disturbances and aid in revegetation efforts.

2.1.9 Summary of Estimated Disturbances

Table 2-3 summarizes the estimated disturbances from implementing the proposed project.

Table 2-3
Estimates of Additional Disturbance Areas – Brown Cow II Project Area

Facility	Evaluation Phase			Operations
	Length (feet)	Width (feet)	Short-Term (acres)	Long-Term (acres)
New Roads	25,902	50 ST/ 30 LT	29.7	17.8
New Gathering Lines	37,225	20	17.1	0.0
Utilities	31,901	10	7.3	0.0
New Drill Pads (12)	300	200	24.0 ^a	3.0 ^b
Injection Wells (5)	Existing Disturbance		0.0	0.0
Compressor Station	Existing Disturbance ^c		0.0	0.0
Total Disturbance			78.1	20.8

Notes:

ST = short-term

LT = long-term disturbance

^a *New drill pads are 2.0 acres each for calculating short-term disturbance*

^b *New drill pads are 0.25 acre each for calculating long-term disturbance*

^c *The site is a highly disturbed location and installation would not result in new disturbance*

2.1.10 Project-Wide Mitigation Measures and Procedures

The Proponents have voluntarily agreed to use and comply with measures and procedures to avoid or mitigate impacts to resources or other land uses. These measures and procedures will be referred to as BMPs throughout this document.

2.1.10.1 Preconstruction Planning, Design, and Compliance Measures

1. The Proponents will designate a qualified representative to serve as compliance coordinator. This person would be responsible for ensuring that all requirements of the APD and Plan of Development (POD) (e.g. MSUP, MDP, COAs, and/or Terms and Conditions) are followed.
2. New roads would be constructed and existing roads maintained in the BCII PA in accordance with the standards in BLM Manual 9113 for resource roads and construction details outlined in the MSUP and COAs.
3. Roads would be crowned with a 0.3-foot to 0.5-foot crown and ditched. The topsoil would be graded over the cut slope so no berm is left at the top of the cut slope.
4. Culverts would be covered with a minimum of 12 inches of fill or one-half the diameter of the pipe, whichever is greater. The inlet and outlet would be set flush with existing ground and aligned in the center of the draw. Before the area is backfilled, the bottom of the pipe would be bedded on stable ground that does not contain expansive or clay soils, protruding rocks that could damage the pipe, or unevenly sized material that would not form a good seat for the pipe. The area would be backfilled with unfrozen material and rocks no larger than two inches in diameter. Care would be exercised to thoroughly

compact the backfill under the culvert and would be raised evenly in six-inch layers on both sides of the culvert.

5. Additional culverts would be installed in the existing access roads as needed or as directed by the BLM.
6. Access roads would be surfaced with an appropriate grade of aggregate or gravel to a depth of four inches before the drilling equipment or rig is moved onto the pad.
7. Access roads would be maintained in a safe and usable condition. A regular maintenance program would include, but is not limited to, blading, ditching, installing or cleaning culverts, and surfacing.
8. If snow must be removed outside of access roads, snow removal equipment would be equipped with shoes to raise the blade off the ground surface. Special precautions would be taken on uneven ground to prevent the equipment from destroying vegetation.
9. Wing ditches would be constructed, as necessary, to divert water from roadside ditches.

2.1.10.2 Resource-Specific Requirements

The Proponents propose to implement the following resource-specific mitigation measures, procedures, and BLM management requirements on public lands.

Geology, Minerals, and Paleontology

Mitigation measures presented in the sections of this EA pertaining to soil and water resources would avoid or minimize potential impacts to surface mineral resources. The BLM and WOGCC policies on casing and cementing would protect subsurface mineral resources from adverse impacts.

Scientifically valuable paleontological resources that may occur in the BCII PA would be protected through the following mitigation measures:

1. Project personnel will make contingency plans for the accidental discovery of scientifically valuable fossils. If construction personnel discover fossils during implementation of the proposed project, the BLM will be notified immediately. If the fossils could be adversely affected, construction would be redirected until a qualified paleontologist has assessed the importance of the uncovered fossils and the extent of the fossiliferous deposits and has implemented recommendations for further mitigation.
2. No specific data currently exists on deposits of high or undetermined paleontologic potential in BCII PA. For that reason, field surveys for paleontologic resources will be conducted on a case-by-case basis. These resources would be surveyed in areas where surface exposures of the Browns Park, Green River, or Wasatch Formations occur. Field surveys may result in identification of additional mitigation measures to reduce adverse impacts to fossil resources. This mitigation may include collection of additional data or representative samples of fossil material, monitoring excavation, or avoidance. In some cases, no action beyond measures taken during the field surveys may be necessary.
3. A report will be submitted to the BLM after each field survey is complete. The report will describe in detail the results of the survey with a list of fossils collected, if any, and may recommend additional mitigation measures. If scientifically valuable fossils are

collected, the report must document the curation of specimens into the collection of an acceptable museum repository and must contain appropriate geologic records for the specimens.

Air Quality

1. All activities conducted or authorized by the BLM must comply with applicable local, State, Tribal, and Federal air quality regulations and standards. The Proponents will adhere to all applicable ambient air quality standards, permit requirements (including preconstruction, testing, and operating permits), standards for motorized equipment, and other regulations, as required by the State of Wyoming, WDEQ, and AQD.
2. The Proponents would not allow garbage or refuse to be burned at well locations or other facilities. Before any wells are vented or flared, WDEQ-AQD would be notified, as required by Wyoming Air Quality Standards and Regulations, Chapter 1, Section 5 Reporting Guidelines for Well Flaring and Venting. Test periods longer than 15 days will require authorization by WOGCC, in accordance with Chapter 3, Section 40 Authorization for Flaring and Venting of Gas.
3. On Federal land, the Proponents would immediately abate fugitive dust by application of water, chemical dust suppressants, or other measures when air quality is impaired, soil is lost, or safety concerns are identified by the BLM or the WDEQ-AQD. These concerns include, but are not limited to, actions that exceed applicable air quality standards. The BLM will approve the control measure, location, and application rates. If watering is the approved control measure, the Operator must obtain the water from State-approved sources.

Soil and Water Resources

1. The Proponents will avoid using frozen or saturated soils as construction material.
2. The Proponents will selectively strip and salvage topsoil from all disturbed areas. Topsoil will be removed and conserved to a minimum depth of six inches and a maximum depth of 12 inches from all disturbances, unless otherwise agreed to by the BLM and the Operator.
3. Where possible, disturbance to vegetated cuts and fills will be minimized on existing improved roads.
4. Drainage crossings will be designed to carry the 25-year discharge event, or as otherwise directed by the BLM.
5. The Proponents will erect snow fencing or other suitable structures for the capture of snow on specified locations and for the minimization of wind scouring on erosive sites.
6. The Proponents will maintain a 100-foot wide buffer of natural vegetation (not including wetland vegetation) between construction and ephemeral and intermittent stream channels.

The Proponents will include adequate drainage control devices and measures in the design of roads (e.g. berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipaters). These devices and measures would be located at sufficient intervals and intensities to adequately control and direct surface runoff above,

below, and within the road to avoid erosive, concentrated flows. In conjunction with surface runoff or drainage control measures, the Proponents would use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. In addition, the Proponents would implement a revegetation program as soon as possible to reestablish the soil protection afforded by vegetation.

When construction that is not specifically required for production operations is complete, the Proponents will restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and at other facilities. The Proponents also will replace up to six inches of topsoil or suitable plant growth material over all disturbed surfaces.

7. To minimize the cumulative effects of the BCII POD in combination with the existing Browning Field developments, the Operator shall prepare a plan for the clean-up and removal (where possible) of existing and/or discarded equipment and facilities associated with the Browning Field. The plan shall include the painting of the remaining above-ground facilities to an appropriate color, remediation of several small oil and other substance releases, and revegetation of the existing disturbances. The plan shall be submitted by Sundry Notice to the BLM, and shall include a timeline for completion. Upon BLM approval of the plan, the Operator shall implement the plan and provide notification to the BLM upon completion.
8. The Proponents will limit construction of all drainage crossings to no-flow or low-flow periods.
9. The area of disturbance would be minimized within ephemeral, intermittent, and perennial stream channels.
10. The Proponents will design channel crossings to minimize changes in channel geometry and subsequent alterations in flow hydraulics.
11. Interceptor ditches, sediment traps, water bars, silt fences, and other revegetation and soil stabilization measures would be designed and constructed, as needed.
12. The Proponents will construct channel crossings by pipelines such that the pipe is buried a minimum of four feet below the channel bottom.
13. Disturbed stream beds would be regraded to the original geometric configuration and would contain the same or similar bed material.
14. Wells must be cased during drilling and all wells cased and cemented in accordance with Onshore Order No. 2 to protect all high-quality aquifers. High-quality aquifers exhibit known water quality of 10,000 milligrams per liter (mg/L) total dissolved solids (TDS) or less. Well casing and cementing must be of adequate integrity to contain all fluids under high pressure during drilling and well completion. Furthermore, wells will adhere to the appropriate BLM cementing policy.
15. The reserve pits would be constructed in cut rather than fill materials. Fill material must be compacted and stabilized, as needed. The subsoil material of the pit to be constructed should be inspected to assess stability and permeability and to evaluate whether reinforcement or lining is required. If lining is required, the reserve pit must be lined with a reinforced synthetic liner at least 12 mils thick and with a bursting strength of 175 by 175 pounds per inch (American Society for Testing and Materials [ASTM] Standard

D 75179). Use of closed or semi-closed drilling systems should be considered in situations where a liner may be required.

16. Two feet of freeboard must be maintained on all reserve pits to ensure they are not in danger of overflowing. Drilling operations must cease if leakage is found outside of the pit and remain so until the problem is corrected.
17. Hydrostatic test water used in conjunction with pipeline testing and all water used during construction must be extracted from sources that contain sufficient water quantities and with appropriation permits approved by the State of Wyoming.
18. The Proponents will develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required by WDEQ permit requirements.
19. The Proponents will exercise stringent precautions against pipeline breaks and other potential accidental discharges of oil or hazardous chemicals into adjacent streams. If liquid petroleum products are stored on-site in sufficient quantities (per the criteria contained in Title 40 Code of Federal Regulations [CFR] Part 112, dated December 1973 and updated in July 2002), a Spill Prevention Control and Countermeasures (SPCC) plan will be developed.
20. The Proponents will coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (USACE).
21. The BLM must approve, in writing, any changes in the method or location for disposal of produced water.

Vegetation, Wetlands, and Noxious/Invasive Weeds

1. An approved Pesticide Use Proposal would be obtained before pesticides are applied to control weeds on BLM surface ownership lands.
2. Disturbed areas would be seeded and stabilized in accordance with BLM-approved reclamation guidelines.
3. The Operator shall initiate a weed monitoring and control effort upon authorization. The Operator shall, at least annually, provide a report to the BLM with (1) a map of the well locations, facilities, and road segments reviewed; (2) a map of any identified weed populations, labeled by species; and (3) a plan for treatment and control (including documentation of previous control efforts).
4. Initiate interim reclamation (e.g. pit evaporation/fluid removal/pit solidification, recontouring, ripping, spreading topsoil, seeding, and weed control) for areas unnecessary for production operations as soon as possible after drilling operations are completed, but within no more than one year from the date TD is reached.

Range Resources and Other Land Uses

1. The Proponents will coordinate with the affected livestock operators to ensure that livestock control structures remain functional (as directed by the livestock operator) during drilling and production operations, and to coordinate timing of activities.
2. Traffic control and speed limits would be used to limit potential conflicts between operators and livestock.

Wildlife and Fisheries

1. During reclamation, the Proponents would establish a variety of forage species that would return the land to a condition that approximates its state before disturbance. In the short-term, grasses would be established and, in the long-term, shrub and forb species would naturally establish.
2. The Proponents will prohibit unnecessary off-site activities of operational personnel near the drill sites. The Proponents also will inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.
3. Construction will not be allowed during critical nesting season (February 1-July 31) near active raptor nests. Seasonal timing restrictions within a “buffer zone” around nests to avoid disturbance to nesting raptors would reduce the impact from construction activities. In addition, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence would not be constructed within 825 feet of raptor nests, except ferruginous hawks, where the restriction would be 1,200 feet (restriction generally excludes surface disturbance). Exception requests may be granted if nests are found to be inactive, or modified if there is visual screening of the nest that is determined by the BLM to be sufficient to minimize impacts.
4. Surface disturbing activities will not be allowed within 0.25 mile of the perimeter of identified active or occupied greater sage-grouse leks. Human activity would be avoided between 6:00 p.m. and 9:00 a.m. from March 1 to May 20 within 0.25 mile of the perimeter of occupied leks; surface disturbance and other actions that create permanent and high-profile structures such as buildings, storage tanks, and overhead power lines will not be constructed within 0.25 mile of the perimeter of leks, as determined on a case-by-case basis. Surface disturbing and disruptive activities will not be allowed between November 15 and March 14 in delineated winter concentration areas and, to minimize noise disturbances to strutting or dancing grouse, the Proponents would locate compressor stations and generators appropriately so that noise at any nearby greater sage-grouse or sharp-tailed grouse display grounds does not exceed 49 decibels on the A-weighted scale (dBA) (10 dBA above background noise). Other techniques and/or equipment can be utilized when it is demonstrated that they result in similar or increased noise reduction. Additional noise reduction techniques may be required if research shows that current techniques are not adequate.
5. The Proponents will protect greater sage-grouse nesting habitat during the breeding, egg-laying, incubation, and early brood-rearing period (March 1-July 15) by restricting construction within a two-mile radius of active leks for greater sage-grouse. Exceptions may be granted if the activity will not interfere with greater sage-grouse nesting activity.
6. All prairie dog colonies on the BCII EA would be avoided, where practical. If prairie dog colonies of sufficient size and burrow density to accommodate black-footed ferrets are scheduled to be disturbed, as identified in annual reports, then black-footed ferret surveys of the colonies would be conducted pursuant to BLM and/or US Fish and Wildlife Service (USFWS) decisions made during informal consultations. Survey protocol would adhere to USFWS guidelines and would be conducted by a USFWS-qualified biologist a maximum of one year in advance of the proposed disturbance. Reports identifying survey methods and results will be prepared and submitted to the USFWS and the BLM in accordance with Section 7 of the Endangered Species Act of

1973, as amended (ESA) and the Interagency Cooperation Regulations. Surveys will be financed by the Operators. If black-footed ferrets are found on the BCII PA, the USFWS would be notified immediately and formal consultation would be initiated to develop strategies that ensure no adverse effect to the species would occur. Before ground-disturbing activities are initiated in black-footed ferret habitat, authorization to proceed must be received from the BLM, in consultation with the USFWS.

7. Construction activities in potential mountain plover nesting habitat during the nesting period (April 10-July 10) would not be allowed unless an exception is granted. An exception may be granted if a survey for mountain plovers is conducted and none are found within areas of potential habitat prior to any surface disturbance in those areas, according to current mountain plover survey protocol (USDI-FWS 2002).
8. All pits and open cellars must be fenced for the protection of wildlife and livestock and fencing must be in accordance with BLM specifications. Netting must be placed over all production pits to eliminate any hazard to migratory birds or other wildlife. Netting is also required over reserve pits that have been identified as containing oil or hazardous substances (per the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Section 101 (14)), as determined by visual observation or testing. The mesh diameter will be no larger than one inch.
9. No construction activities or prolonged maintenance actions would be conducted within big game crucial winter range during the crucial winter period of November 15-April 30.

Recreation

1. The Proponents must minimize conflicts between project vehicles/equipment and recreation traffic by posting warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

Visual Resources

1. The Proponents must use existing topography to screen from view the proposed access roads, pipeline/utility corridors, wellheads, and production facilities as well as drill rigs.
2. The Proponents must paint structures, wells, and facilities with flat colors (such as Carlsbad Canyon or Shale Green) that blend with the adjacent undisturbed terrain and would be a color specified by the BLM. This measure does not apply to structures that require safety coloration in accordance with the requirements of the Occupational Safety and Health Administration (OSHA).

Cultural Resources

1. Avoidance is the preferred method for mitigating adverse effects to a property that is considered eligible for listing, or is already listed in, the National Register of Historic Places (NRHP).
2. Adverse effects to cultural or historical properties that cannot be avoided would be mitigated by implementing a cultural resources mitigation plan (including a data recovery plan).

3. If cultural resources are discovered at any time during construction, all construction would cease and the BLM would be immediately notified. Work would not resume until the BLM issues a Notice to Proceed.
4. A BLM-permitted archaeologist will monitor all well pad, access road, and pipeline corridor construction activities and conduct an open-trench inspection of the pipeline in areas that have a high potential for intact, buried cultural deposits or near known buried cultural resources.
5. All above-ground facilities will be painted a color compatible with the local environment to minimize visual intrusions to the historic setting of the Cherokee Trail.
6. Access roads will be surfaced with materials that are compatible with the local environmental colors to minimize visual intrusions to the historic setting of the Cherokee Trail.

Socioeconomics

1. Project activities must be coordinated with ranching operations to minimize conflicts that involve movement of livestock or other ranch operations. Coordination would include scheduling project activities to minimize potential disturbance of large-scale livestock movements. The Proponents would establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.
2. The Proponents and their subcontractors would obtain Carbon County sales and use tax licenses for purchases made in conjunction with the proposed project so that project-related sales and use tax revenues will be distributed to Carbon County.

Transportation

1. Roads that are not required for routine operation and maintenance of producing wells and ancillary facilities would be permanently blocked, reclaimed, and revegetated.
2. Permits are required from Carbon County for any access to or across a County Road or for any pipeline that crosses a County Road. These permits would be acquired before additional roads are built. All roads on public lands that are not required for operation and maintenance of field production would be permanently blocked, re-contoured, and seeded. Roads on private lands would be treated in a similar manner, depending on the desires of the landowner.
3. The Proponents will be responsible for preventive and corrective maintenance of roads in the BCII PA throughout the duration of the project. Maintenance may include blading, cleaning ditches and drainage facilities, abating dust, controlling weeds, or other requirements as directed by the BLM or the Carbon County Road and Bridge Department.
4. Except in emergencies, access to the BCII PA would be limited to drier conditions to prevent severe rutting of road surfaces. Culverts would be installed where needed to allow drainage in all draws and areas of natural drainage. Low water crossings will be used where applicable. On-site reviews will be conducted with BLM personnel for approval of proposed access before any construction begins.

Health and Safety

1. Sanitation facilities installed on the drill sites and any resident camps will be approved by the WDEQ.
2. To minimize undue exposure to hazardous situations, the Proponents will comply with all applicable rules and regulations (such as Onshore Orders and OSHA requirements) that would prevent the public from entering hazardous areas and the Proponents will post warning signs to alert the public of truck traffic.
3. The Proponents will haul all garbage from the drill sites to a State-approved sanitary landfill for disposal. In addition, the Proponents will collect and store any garbage or refuse on-site until it can be transported in containers approved by the BLM.

Hazardous Materials

1. SPCC plans will be written and implemented, as necessary, in accordance with 40 CFR Part 112 to prevent discharge into navigable waters of the United States.
2. If quantities that exceed 10,000 pounds or the threshold planning quantity (TPQ), as designated by the RFO, are to be produced or stored in association with the proposed project, chemical and hazardous materials would be inventoried and reported in accordance with the toxic release inventory (TRI) requirements set forth in Title III of the Superfund Amendments and Reauthorization Act (SARA) and codified at 40 CFR Part 335. The required Section 311 and 312 forms would be submitted at the specified times to the State and County emergency management coordinators as well as to local fire departments.
3. Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), would be transported and disposed of in accordance with all applicable Federal, State, and local regulations.
4. All production facilities installed on-site that have the potential to leak or spill oil, glycol, produced water, or other fluids that may constitute a hazard to public health or safety shall be placed within an appropriate containment or diversionary structure sufficient to hold at least 110% of the largest container within the facility. The structure shall be impervious to any oil, glycol, produced water, or other hazardous fluid for 72 hours. In addition, the structure will be constructed so that any discharge from a primary containment system will not drain to, infiltrate, or otherwise escape to groundwater, surface water, or navigable waters before cleanup is completed.
5. The Operator shall maintain a hazardous materials/oil and gas release contingency response plan that applies to the proposed project, and shall provide the BLM with a copy of the current plan and any subsequent changes made to the plan.

Noise

1. The Proponents will muffle and maintain all motorized equipment according to manufacturer's specifications.
2. The BLM will require that noise levels be limited to no more than 10 dBA above background levels, as measured at greater sage-grouse leks. The BLM will require that compressor engines located on public lands be enclosed in a building and located at least

600 feet away from sensitive receptors or sensitive resource areas to comply with this limit on noise levels.

2.2 ALTERNATIVE 2 – NO-ACTION ALTERNATIVE

Section 1502.14(d) of NEPA requires that the alternatives analysis “include the alternative of no action.” “No Action” implies that ongoing natural gas production activities, if any exist, would be allowed to continue by the BLM in the BCII PA, but the proposed project would not be allowed. The BCII PA has been disturbed by existing conventional and CBNG drilling. The BLM will consider additional APDs and ROW actions for Federal land on a case-by-case basis consistent with the scope of existing environmental analysis. Additional gas development could occur on State and private lands within the BCII PA under APDs approved by the WOGCC.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The proposed project was developed considering measures provided in the ARPA Interim Drilling Policy – Development Authorized Concurrent with EIS Preparation for the Atlantic Rim CBNG Project.

Wells and ancillary facilities were reviewed during the alternatives analysis to determine the best feasible locations to meet the stated purpose and need. Ten of the 12 production well locations and their associated access roads were moved during a field review. The wells were moved to new pad sites that would result in less impact to soil, vegetation, water, and wildlife resources. The following wells and associated road alignments were moved from the locations originally considered based on impacts to resources:

1. Well 1491 1-11 – Well pad and access road moved to eliminate large cuts/fills and co-locate well with existing disturbance.
2. Well 1491 7-14 – Well pad and access road moved to eliminate steep road grade. Access road junction with existing road moved and re-aligned at 90-degree angle to eliminate two junctions.
3. Well 1491 11-2 – Well pad moved to reduce cuts/fills.
4. Well 1491 9-14 – Well pad and access road moved to avoid steep road grade.
5. Well 1491 3-14 – Access road moved to minimize surface disturbance.
6. Well 1491 11-11 – Access road moved to reduce disturbance to serviceberry brush plant community.
7. Well 1491 3-11 – Well pad moved to avoid large cuts/fills.
8. Well 1491 15-2 – Well pad moved and rotated to avoid disturbance of rocky slope.
9. Well 1491 15-11 – Well pad and access road moved to avoid steep road grade and spring outcrop.
10. Well 1491 9-11 – Well pad and access road moved to avoid steep road grade and large cuts/fills.

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